Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
An Inquiry into the Commission's	)	
Policies and Rules Regarding AM	)	MM Docket No. 93-177
Radio Service Directional Antenna	)	RM-7594
Performance Verification	)	

Reply Comments of Potomac Instruments, inc.

Potomac Instruments, inc., ("**PI**") hereby submits its reply comments in response to the above referenced Notice of Proposed Rule Making ("NPRM") adopted May 28 1999 and released June 11 1999.

AM Field Strength Meter Instrumentation Uncertainties

The three known certification sources for industry standard AM broadcast field strength meters are:

1.) National Institute of Standards and Technology ("NIST"), Boulder Colorado
2.) Federal Communications Commission ("FCC") Laboratory, Laurel Maryland
3.) Potomac Instruments, inc., Silver Spring, Maryland

PI maintains its standard field calibration to within 1% of the NIST standard and a correction factor "K" is provided for each of 12 or 24 cardinal frequencies (depending upon the tunable spectrum of the instrument being calibrated) for the purpose of arithmetic data correction should that be necessary. Random (normal distribution) manufacturing tolerances can account for meter tracking uncertainties of up to 3.0% and attenuator tracking uncertainties of up to 2.0%. Therefore, for any given reading to differ, at any given frequency, and at any given attenuator setting from the NIST corrected value by 6.0% (0.5 dB), all components of instrument uncertainty would have to be additive. This scenario is statistically improbable and practically unattainable.

NIST believes that the "root-sum-of-squares" ("RSS") uncertainty for its standard field is within 3.0% (0.26 dB). Accordingly, if the NIST maximum component of uncertainty is added to the maximum components of antenna factor + meter tracking +attenuator uncertainty, it is statistically possible for the indicated value of field strength to differ from the *true* value of field strength by as much as three quarters of a dB.

Uncertainties relating to antenna factor, meter tracking, and attenuator tracking can be "calibrated out " through a process called *incoming calibration* at a specific frequency and within a specific range. During an incoming calibration, correction factors are determined by the calibration facility, for each of the random components of uncertainty. These correction factors are applied to measured data during a "post processing" data re-tabulation and the combined standard uncertainty is reduced to NIST standard uncertainty + 1.0%.

The purpose of these comments is to illuminate the semantic distinction between *measurement error* and *measurement uncertainty*. It is hoped that the reader will come to understand that a measured value can be very close to the *true* value and thus have negligible error even in the presence of seemingly large components of uncertainty.